BUILD Grant Application Report by the NC Department of Transportation

Section 34.17 of S.L. 2018-5 *July 12, 2018*

GRANT Application Submission Project

The ***I-85/I-40 Foundations for Automated and Safer Transportation*** Project (FAST) was developed through an innovative partnership between North Carolina's Departments of Transportation (NCDOT) and Information Technology, and the state's private technology sector. The Project will install or replace fiber along the I-85/I-40 corridors from Raleigh to Charlotte, as well as implement Wrong-Way Vehicle Detection/Notification systems and Dynamic Curve Warning System. In addition, by utilizing artificial intelligence (AI), additional risky behaviors and dangerous conditions will be detected, and first responders alerted. The Project directly addresses the dual challenge of improving physical and digital connectivity in North Carolina's communities and economic hubs.

Background

Currently, NCDOT's transportation management centers (TMCs) have very constrained connectivity to one another due to the lack of fiber connection between them. NCDOT currently maintains expensive leased facilities for this purpose, and far fewer video streams can be viewed over these connections than desired. In addition, the lack of a reliable, real-time connection hinders the deployment of safety systems along the routes. Finally, the communications infrastructure to support Connected and Automated Vehicle (CAV) operations is lacking.

The following 9 North Carolina counties will directly benefit from this project:

1. Wake
2. Durham
3. Orange
4. Alamance
5. Guilford
6. Randolph
7. Davidson
8. Cabarrus
9. Mecklenburg

Timeline

The application is due July 15, 2019. Final BUILD Grant determinations will be made by December 20, 2019. The Project can be fully constructed by December 2025.

Expected Cost and Funding Request

The estimated cost for the project is expected to be between $22M and $24M once the Project details have been confirmed. The funding request is expected to be approximately $8M, with the balance paid through state funds.

Federal Criteria the Project Proposes to Meet

The Project addresses multiple criteria in the BUILD Grant notice. These include safety, economic competitiveness, quality of life, state of good repair, innovation and partnership. If NCDOT

receives a lease payment from a private fiber company for use of the crossing, the Project could also offer a source of non-federal revenue for future transportation infrastructure investments.

Broadband/Technology Benefits to NC Communities & Businesses

The possibility of a partnership with broadband will help foster an increase in rural internet access through improved speeds and reliability. Many internet applications require higher speed internet capability with the result that rural households and businesses reliant on dial-up or lower speed services are effectively closed out of that part of the digital economy. Moreover, while some internet services can be provided via satellite, hilly terrain and atmospheric conditions constrain the reliability relative to fiber-based broadband. In addition, the prospect of adding 5G cellular network has created the incentive for the private sector to upgrade their size and the reach of their fiber networks, especially in metropolitan areas. As the project covers both rural and urban areas, the possibility of addressing both needs exists.

Second, the completion of a fiber-optic backbone along the corridor adds capabilities to the management and performance of the roadway itself. Work zone safety along the corridor will be enhanced by allowing reliable communications between TMCs and roadside devices. Safety sensors could detect weather conditions and alert drivers and operations personnel of wet or freezing conditions, making the road safer.

Finally, the expansion of NCDOT's fiber-optic network will increase the interconnection of the state's freight nodes (such as weigh stations) and allow instantaneous sharing of safety and enforcement data.

Enhancing Roadway Safety

The project will deploy several systems to improve safety at key locations:

> *Wrong-Way Vehicle Detection and Notifications Systems* – The occurrence of wrong-way driving crashes, though rare, is often deadly in nature. This project will identify locations, based on proven national data, where the highest probability of a crash will occur, and deploy state of the art wrong-way driving countermeasures that will immediately notify the TMC, first responders and the public, as well as giving the driver feedback, in the form of warning wrong-way signs with built-in red LEDs, to correct their movement.
> *Dynamic Curve Warning Systems* –A low-cost and proven effective tool, Dynamic Curve Warning Systems are placed at horizontal curve locations (e.g. interchange loops) where unsafe vehicle speeds indicate a crash problem. The system detects oncoming vehicles traveling at an unsafe speed and warns drivers to slow down with electronic sign feedback. The project will identify locations for deployment.

BUILD Grant Application Report by the NC Department of Transportation

Section 34.17 of S.L. 2018-5 *July 12, 2018*

Video Analytics – The project will deploy, using existing NCDOT traffic camera sites, video processing technology to identify high-danger activities or situations such as driving while impaired, human trafficking, debris in the road, and notify public safety officials.